

Enginuity Submission to the Science and Technology Committee (Lords) Call for Evidence: People and skills in UK STEM – 6 September 2022

Introduction

1. Enginuity is a registered charity which acts as the sector connector for the advanced manufacturing and engineering industry. We marry engineering skills with ingenuity with data to design and constantly improve tools and solutions that enable individuals, employers, education providers and governments to plan and meet their skills and workforce needs.
2. We would be happy to provide the Committee with further details of the evidence set out in this submission or the tools and solutions we are developing.

Response to Questions

2) STEM skills

Are businesses able to recruit people with appropriate STEM skills?

3. The recruitment of workers with appropriate STEM skills remains a fundamental concern for employers. The Institute of Engineering and Technology (IET) skills survey of engineering employers (IET survey) demonstrates the continuing challenges employers face in recruiting, with 49% experiencing difficulties in the skills available to them in the external labour market (48% in 2019 and 47% in 2020), and 45% experiencing difficulties with skills gaps or limitations within their internal workforce (46% in 2020). Among respondents who did not think their organisation could address a skills gap, 34% gave competition in the marketplace for workers as their main reason. Respondents reported the greatest skills gaps were in high skilled (university level or higher) roles (27%) and intermediate (A-Level, NVQ 3 Level, apprenticeships) roles (31%).¹
4. Enginuity's work with employer groups in both the Aerospace and Automotive sectors show that businesses are struggling to recruit people across a range of common disciplines related to the electrification of transport and battery production, as well as the proposed use of alternative fuels such as hydrogen. The increasing digitalisation of manufacturing processes also gives rise to the need for cross sectoral high level digital skills within the workforce. All of these areas are reliant on STEM skills.

Are STEM graduates being sufficiently prepared for highly skilled careers?

5. The main difficulty in recruitment identified in the IET survey continues to be applicants lacking the necessary technical skills (42% in 2021), and especially the specialist skills and knowledge needed for the role. This is coupled with an increase in general lack of applicants (up from 22% in 2020 to 34% in 2021).² This suggests that STEM graduates may not be being sufficiently prepared by education providers to meet the specific needs of employers in their area.
6. Enginuity is currently developing a suite of tools for the engineering and manufacturing sectors which will help our stakeholders develop a much better

¹ [IET skills and demand in industry 2021 survey](#), p. 20, 22.

² [IET skills and demand in industry 2021 survey](#), p. 26.

understanding of skill needs in specific geographical areas as well as identifying commonality between occupations and job roles to increase transferability.

Is the STEM skills gap growing or shrinking?

- The overall job pool provided by the manufacturing industry in the UK has contracted slightly in the last couple of years from 2,486,371 in 2019 to 2,343,060 jobs in 2021, with a partial recovery projected to 2,370,918 jobs in 2025. 9% of workers are aged between 16 and 24, with 67% over 35 years old.³ Trends in apprenticeship starts and achievements in England show significant falls (start data is available at the link in the footnote).⁴

| Achievements | | | | | |
|-----------------------------------|----------------|----------------|----------------|----------------|----------------|
| | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 |
| Engineering | 7,990 | 8,430 | 8,580 | 6,710 | 7,850 |
| Manufacturing Technologies | 26,760 | 26,640 | 18,400 | 13,500 | 10,390 |
| Transportation | 10,770 | 10,110 | 8,830 | 5,810 | 5,420 |
| Total | 45,520 | 45,180 | 35,810 | 26,020 | 23,660 |

- In contrast, graduate starts in Engineering and Technology have gradually increased from 82,970 in 2014/15 to 94,830 in 2020/21⁵, although only about half of engineering graduates may be entering an engineering occupation.⁶
- There is also a significant loss of over 50s from the workforce, with the inactivity rate for people over 50 rising at the start of the pandemic, after an historical downward trend, a reduction in economic activity of 493,000 over 50s (in October to December 2021) compared to before the pandemic.⁷

3) Education Sector

Do cultural influences such as social media have a role to play in increasing uptake in STEM careers? Could the Government do more to encourage this?

- Recent, in-depth research commissioned by Enginuity from Childwise supports the important role cultural influences play in the uptake of STEM careers. We found that 67% of STEM teachers are actively finding teaching resources using online searches (compared with 33% who are turning to specific teaching websites), and 36% are finding new content via social media. This indicates how important it is for organisations providing quality STEM resources to improve their search engine optimisation and ensure promotional material is made clearly available on social media platforms.⁸

³ Industry data extracted from Lightcast (<https://lightcast.io/>).

⁴ Similar patterns are evident in apprenticeship starts. See <https://explore-education-statistics.service.gov.uk/data-tables/permalink/3dfc0c43-a0b9-4750-b4ab-416ada9e2e56>. Note, some of these data may be affected by policy changes such as the move from frameworks to standards.

⁵ <https://www.hesa.ac.uk/data-and-analysis/students/table-22>

⁶ Royal Academy of Engineering, *Employment outcomes of engineering graduates*, p. 9. The report suggests that about 30% of graduates enter non-engineering roles, with about 20% either unemployed or going on to further study.

⁷ [https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/movementsoutofworkforthoseagedover50yearsincethestartofthecoronaviruspandemic/2022-03-14#:~:text=Economic%20inactivity%20in%20those%20aged,\(Apr%20to%20June\)%202020.](https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/movementsoutofworkforthoseagedover50yearsincethestartofthecoronaviruspandemic/2022-03-14#:~:text=Economic%20inactivity%20in%20those%20aged,(Apr%20to%20June)%202020.)

⁸ Enginuity/Childwise, *Research Report*, August 2022, p. 12.

11. Like social media, gaming is a ubiquitous cultural influence, especially among children and young people. Enginuity has leveraged this cultural influence by launching Skills Miner, an educational game using the Minecraft platform, which provides an accessible way for children to uncover engineering skills through gameplay and exploration.⁹ Enginuity commissioned Childwise to undertake in-depth research on Skills Miner with teachers and students to support the development of the tool, and its delivery in educational settings.

How easy is it to recruit teachers with scientific skills and expertise? What more can be done to encourage highly skilled individuals from all backgrounds to go into STEM education?

12. The evidence suggests that it is challenging to recruit teachers with scientific skills and expertise. There is a general shortage of physics teachers, for example, as well as major regional disparities in access to specialist physics teachers and in teacher quality.¹⁰
13. More could perhaps be done to attract people at the end of their STEM careers, or STEM careers facing redundancy, into teaching, if challenges including salary differences and perceptions could be overcome. There are also challenges in attracting teachers to schools and colleges, often in lower socio-economic areas, which may not be able to offer a full STEM curriculum. Industrial placements and professional development opportunities for teachers, such as those supported through STEM Learnings ENTHUSE Partnerships¹¹, may also be helpful in encouraging skilled people into STEM education, as well as supporting the provision of quality careers advice.

The importance of relevant, accessible and inspiring careers information in schools, including primary schools (topic added by Enginuity)

14. The importance of inspiring children to explore the opportunities offered by STEM careers, and providing them with relevant, accessible and inspiring information about their options, cannot be overstated.¹² Unfortunately, the evidence suggests this is still not being done effectively in many cases.
15. Engineering UK found that among young people (aged 11 to 19) only 43% knew about apprenticeship options and 37% about T-Levels. While among young people aged 13 to 19 only 41% knew the subjects needed to become an engineer.¹³ These conclusions are supported by recent Enginuity/Childwise research. Most children (aged 11-14) surveyed said they knew only a little (46%), nothing at all (36%), or didn't know (10%), about careers in engineering, with only 8% knowing a lot. 63% said they would not be interested in a career in

⁹ <https://enginuity.org/innovation-lab/skills-miner/>. The importance of teaching engineering in primary schools is widely acknowledged; see, for example, [Engineering Kids' Futures](#).

¹⁰ Institute of Physics, *Unlocking the potential of physics skills in the UK and Ireland*, 20 January 2022, p. 9.

¹¹ Institute of Physics, *Unlocking the potential of physics skills in the UK and Ireland*, 20 January 2022, p. 12 and <https://www.stem.org.uk/enthuse-partnerships-schools-and-colleges>.

¹² This need is appreciated beyond educational circles; 43% of engineering employers consider improving the quality of careers advice/guidance, and 36% the wider provision of and signposting to a range of vocational options such as T Levels and apprenticeships, should be a key priority for the UK education system. [IET skills and demand in industry 2021 survey](#), p. 43.

¹³ Engineering UK, *Levelling up engineering skills: widening opportunities for young people*, 2020. The study also shows significant variations in levels of knowledge across the country.

engineering, with concerns about its being boring, as well as too hard, too dirty, and not creative or well paid enough. These findings are particularly significant given how early career ambitions seem to form with 37% of surveyed children (11-14) knowing, and 45% having some idea of, what sort of job they wanted to do when they were older.¹⁴ This indicates the importance of both engaging primary school children with engineering and technology, and providing them with relevant, accessible and inspiring STEM careers advice.

16. Many STEM teachers clearly need support to do this. Among the teachers surveyed, 41% felt they did not know enough to help students who asked for advice about a career in engineering. They also expected most of their students to know only a little (76%) or nothing (18%) about potential careers in engineering. Only 30% regularly incorporated information about possible STEM careers into their lessons, with 51% occasionally and 19% rarely doing so. Although lack of time¹⁵ was the most common reason for this (52%), 26% indicated they didn't know enough about it, and 18% that they didn't know where to find it.¹⁶
17. When asked to consider which resources would be most useful in helping students to learn about engineering opportunities, teachers preferred case studies, an interactive map where students could find information about different manufacturing and engineering industries, and a competition for a student submitted working prototype. When students were asked which resources they preferred, girls favoured an interactive map (41%) and boys detailed job descriptions (39%).¹⁷
18. In addition to being inspiring, resources need to be thoughtfully designed to reach and inspire as diverse a group of children as possible and overcome existing barriers to engagement. For example, the Enginuity/Childwise research found that girls say they know less about, and are four times less likely to be interested in, an engineering career than boys.¹⁸
19. Informed by this research, Enginuity is developing a suite of tools and resources to assist STEM teachers and other professionals to inspire children with enthusiasm for STEM careers.

4) Quality of academic careers

How should the Government encourage a wider range of people to pursue STEM academic careers?

20. Encouraging a wider range of people to pursue STEM academic careers is key to increasing the number of participants and in ensuring teaching and research benefits from a wider range of views and experiences. In addition to immediate and intermediate solutions, as noted above, we strongly believe that considerable effort should be put into inspiring as wide a range of children as possible to engage with engineering and STEM.

¹⁴ Enginuity/Childwise, *Research Report*, August 2022, p. 20, 22-23.

¹⁵ The lack of time may be partly explained by difficulty in obtaining relevant materials, although this was not explicitly addressed in the Enginuity/Childwise research.

¹⁶ Enginuity/Childwise, *Research Report*, August 2022, pp. 13-14, 22, 25.

¹⁷ Enginuity/Childwise, *Research Report*, August 2022, p. 26, 28.

¹⁸ Enginuity/Childwise, *Research Report*, August 2022, p. 22, 23.